

A serene landscape photograph of a calm lake at dawn or dusk. The water is still, reflecting the soft light from the sky. In the distance, several small islands or peninsulas are visible, their silhouettes softened by a layer of mist or fog. The sky is a pale, clear blue, transitioning to a lighter hue near the horizon where the sun is low, creating a gentle glow. The overall mood is peaceful and quiet.

Evaluation of Aquatic Plant Communities Following a Whole Lake Fluridone Treatment to Control For *Myriophyllum spicatum* (Eurasian watermilfoil) – Michigan Case Studies

Upper Midwest Invasive Species Conference
Eau Claire, WI
October 18th, 2016

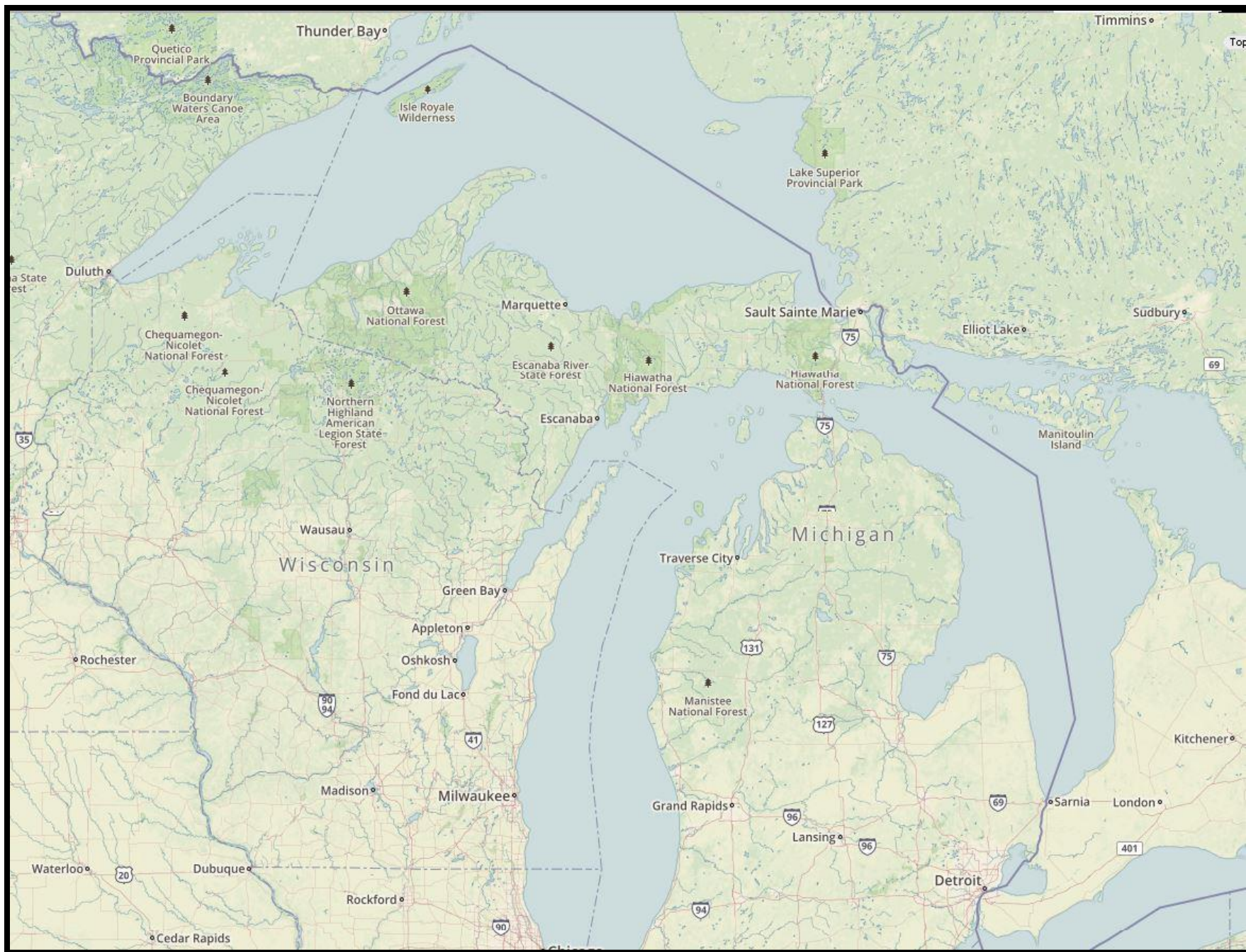
Barb Gajewski
Many Waters, LLC

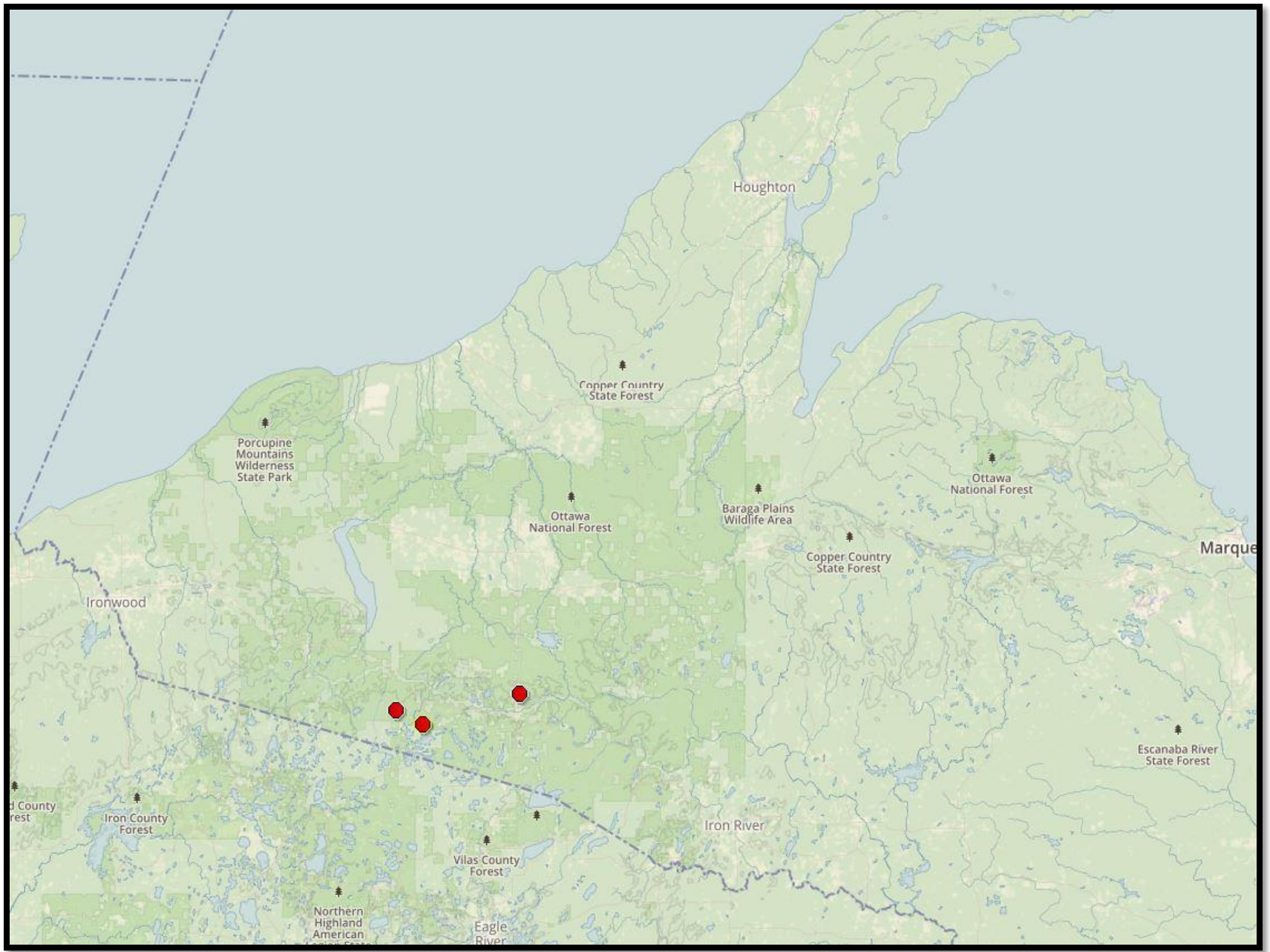
Overview

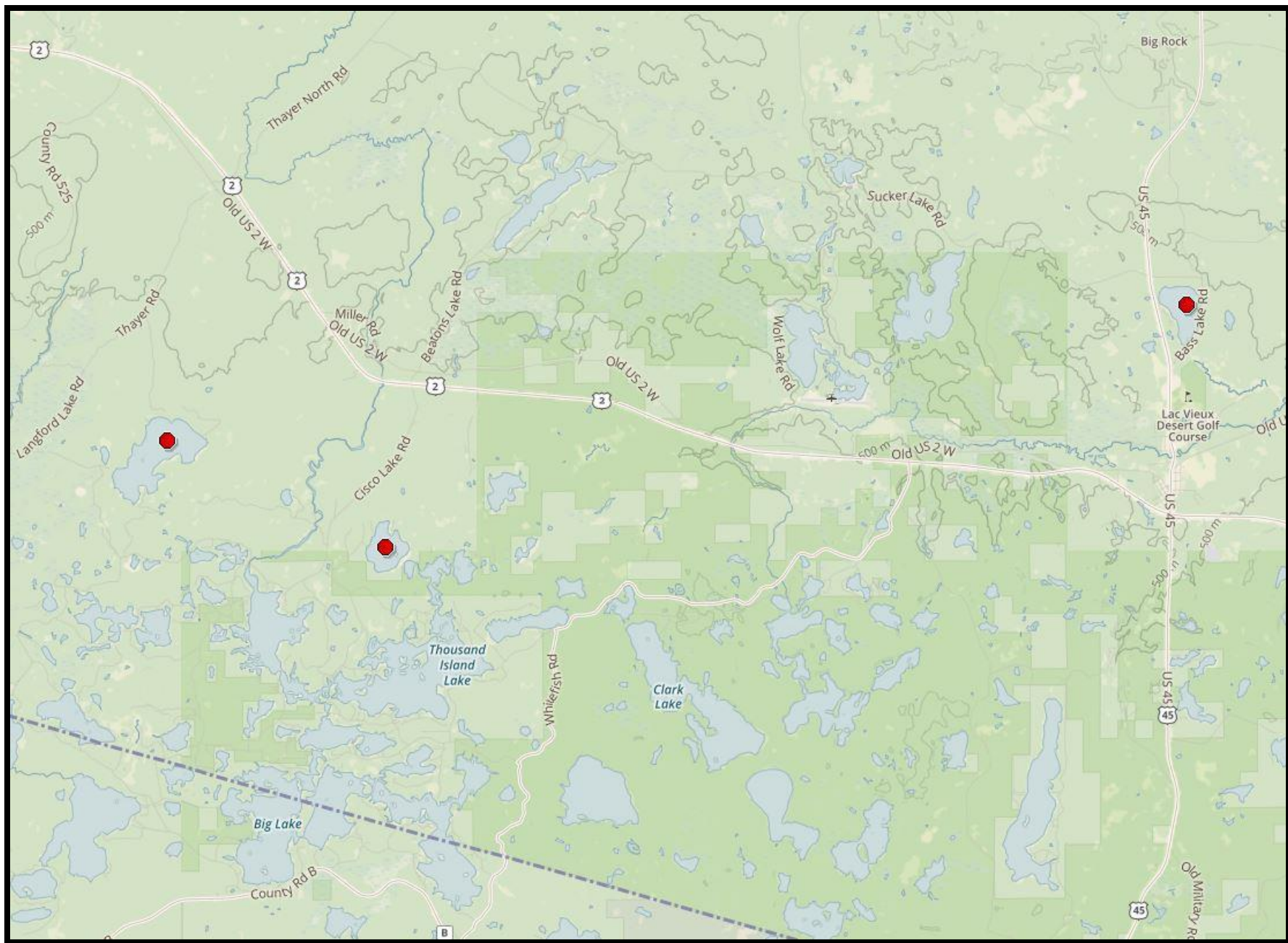
- **Application & Statutory (MI) Guidance for Use**
- **Background**
- **Monitoring Parameters**
- **Aquatic Plant Monitoring Data**
- **Threatened and Endangered Species**
- **Thoughts and Considerations**
- **Questions**

Application & Statutory (MI) Guidance for Use

- Use of aquatic herbicides is regulated by Department of Environmental Quality-Aquatic Nuisance Control (DEQ-ANC)
- Proposed whole-lake treatments require a Lake Management Plan
- Generally, the department will not issue a permit for fluridone use more than once in any three-year period
- In addition to DEQ permits, MDNR required threatened/endangered species permits for Bass and Langford Lakes for *M. farwellii*







Monitoring

- **Fours years of basic water quality sampling**
- **Pre treatment genetics testing and PlanTESTs®**
- **Threatened and endangered species**
- **Fluridone concentration (48 HAT, 14 DAT, 30 DAT & 60 DAT)**
- **Four years of aquatic plant surveys**

DEQ
DEPARTMENT OF ENVIRONMENTAL QUALITY
PROCEDURES FOR AQUATIC VEGETATION SURVEYS

These aquatic vegetation survey procedures have been designed to ensure easily replicable surveys of aquatic plant communities. The methods are easy to use, and they are flexible enough to be used on many different types of lakes, regardless of the extent of littoral zone and shoreline sinuosity. The individual(s) using these methods should be proficient in the identification of aquatic plants. For a listing of recommended aquatic plant identification reference materials, contact the Aquatic Nuisance Control and Remedial Action Unit.

A survey is carried out by sampling individual Aquatic Vegetation Assessment Sites (AVAS's) throughout a lake's littoral zone. The locations of AVAS's are determined by dividing up a lake's shoreline into segments approximately 100 to 300 feet in length. Each AVAS is sampled by using visual observations, dependent upon water clarity, and weighted rake tows. Each separate plant species found in each AVAS is recorded along with an estimate of each species' density. Plant species are identified by numbers designated on the survey map's plant species list, and densities are recorded by using the following code:

- (a) = **found**: one or two plants of a species found in an AVAS, equivalent to **less than 2%** of the total AVAS surface area.
- (b) = **sparse**: scattered distribution of a species in an AVAS, equivalent to **between 2% and 20%** of the total AVAS surface area.
- (c) = **common**: common distribution of a species where the species is easily found in an AVAS, equivalent to **between 21% and 60%** of the total AVAS surface area.
- (d) = **dense**: dense distribution of a species where the species is present in considerable quantities throughout an AVAS, equivalent to **greater than 60%** of the total AVAS surface area.

AVAS's should not be confined solely to a lake's shoreline. In cases where a lake possesses an extensive littoral zone, additional AVAS's should be drawn out near the extent of submergent vegetation growth. This can be done by drawing transect lines divided in proportion to the shoreline AVAS's or by inserting individually drawn boxes with their dimensions proportional to the shoreline AVAS's (see attached sample map). AVAS's should also be drawn around the shoreline of any islands if present.

PRE-SURVEY PROCEDURES

- A. Obtain a map of the lake to be surveyed. Bathymetric maps are preferred; however, if bathymetric maps cannot be located, enlarged copies of United States Geological Survey topographical maps may be used. If a pre-drawn map of the lake does not exist, hand-drawn maps will suffice, as long as they accurately depict the shape of the lake and are drawn to scale. Make a larger format (11" x 17") photocopy of the lake map for ease of editing and survey recording.
- B. Designate the location of the separate AVAS's by drawing lines perpendicular to the lake shoreline (see the attached sample map) every 100 to 300 feet. Keep the AVAS lengths consistent throughout the lake, and add any additional AVAS's where necessary, based upon lake bathymetry. If additional AVAS's are not added at this time, they may be added during the actual survey, based upon current lake conditions.
- C. Attach a copy of a plant species list identifying common species of aquatic plants directly to the survey map. This list should include either the common or scientific names of common aquatic plants corresponding to a specific number for each separate species. The corresponding numbers will be used to record the presence of a species in an AVAS.
- D. Make several copies of the completed lake map for future use, to maintain consistency, and in case multiple maps are necessary during the survey due to inclement weather.

Revised 10/05

Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sampling Design, Field and Laboratory Procedures, Data Entry and Analysis, and Applications



Jennifer Hauxwell, Susan Knight, Kelly Wagner, Alison Mikulyuk,
Michelle Nault, Meghan Porzky and Shaunna Chase

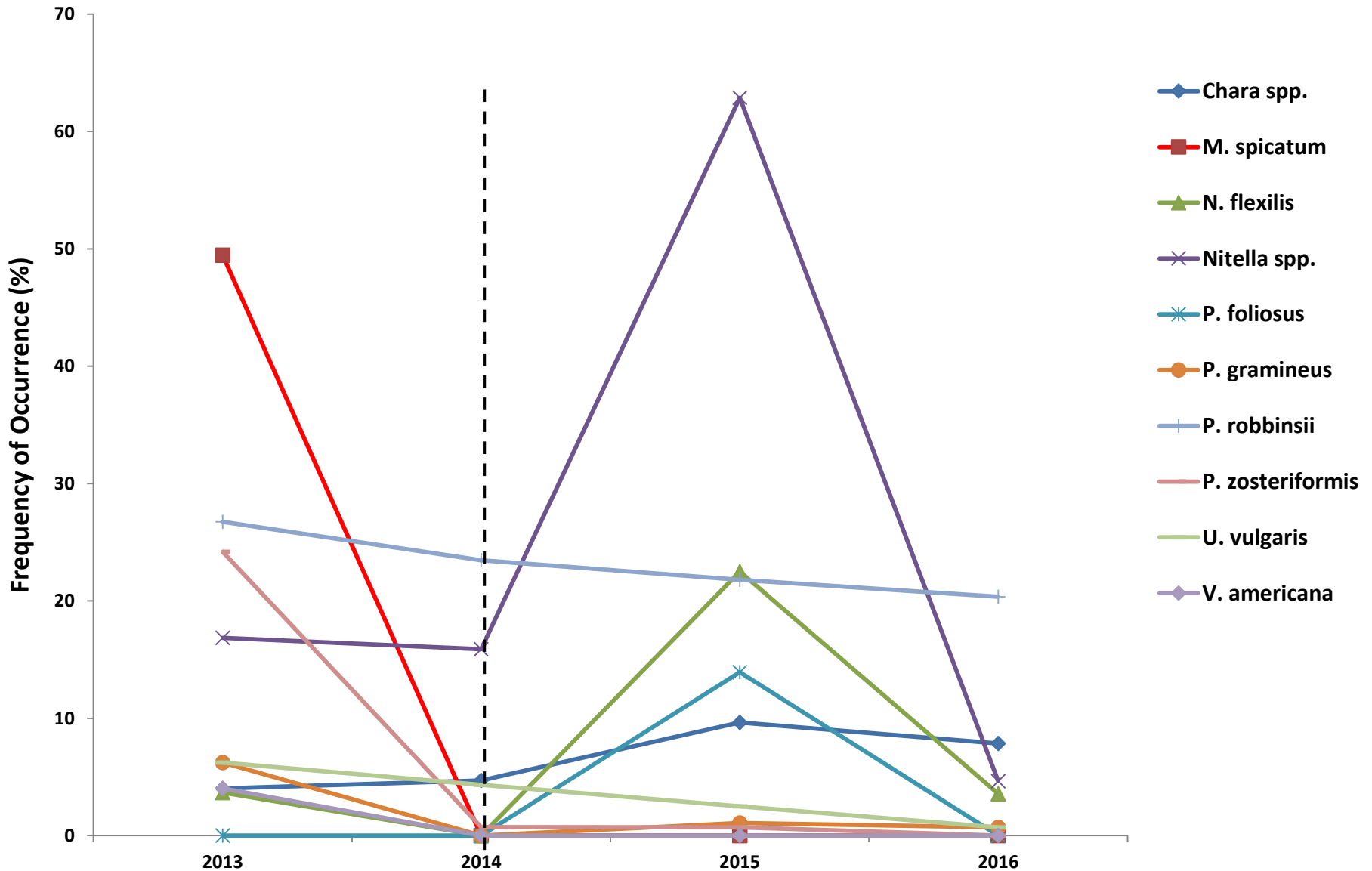
March 2010

Document citation:

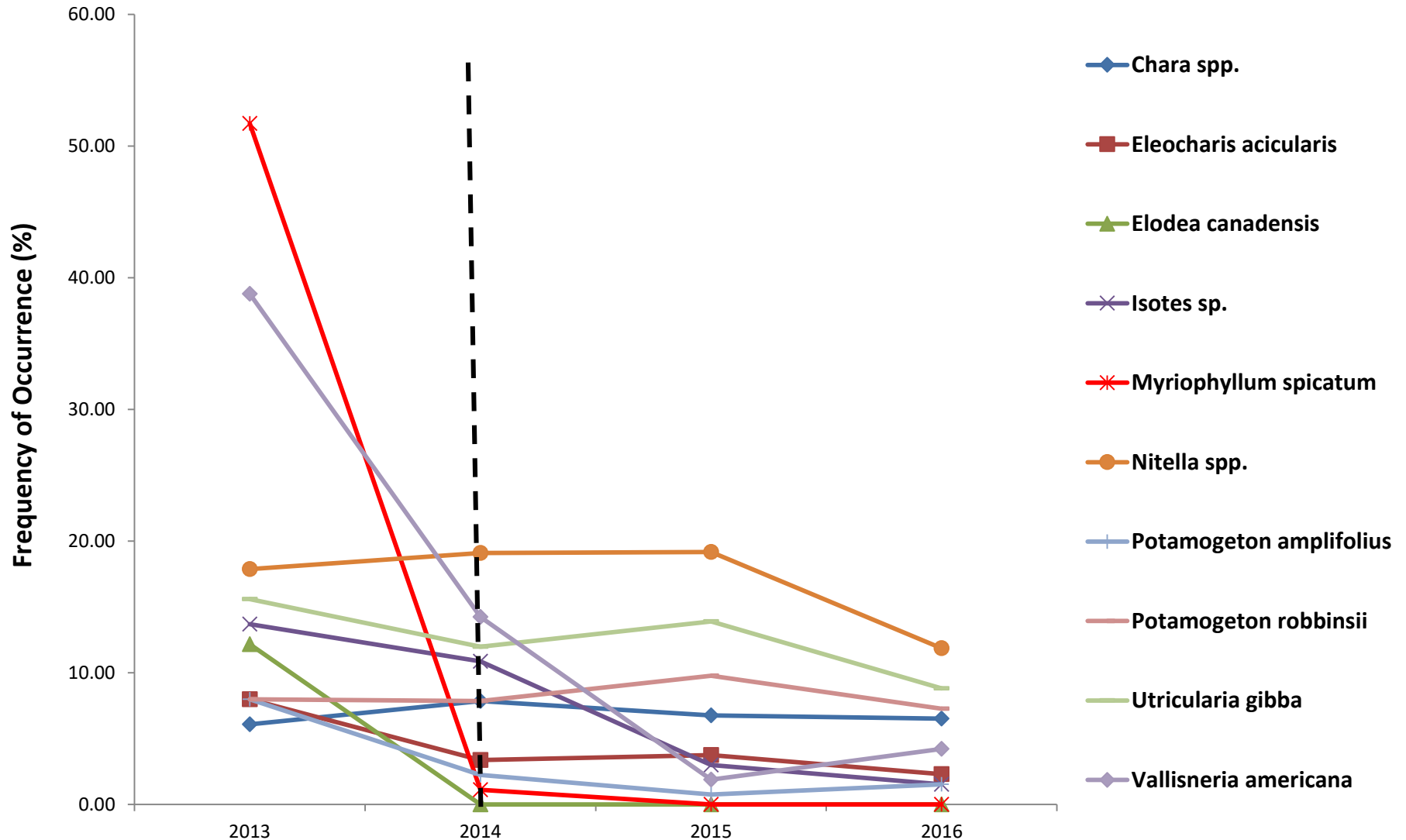
Hauxwell, J., S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky and S. Chase. 2010. Recommended baseline monitoring of aquatic plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications. Wisconsin Department of Natural Resources Bureau of Science Services, PUB-SS-1068 2010. Madison, Wisconsin, USA.



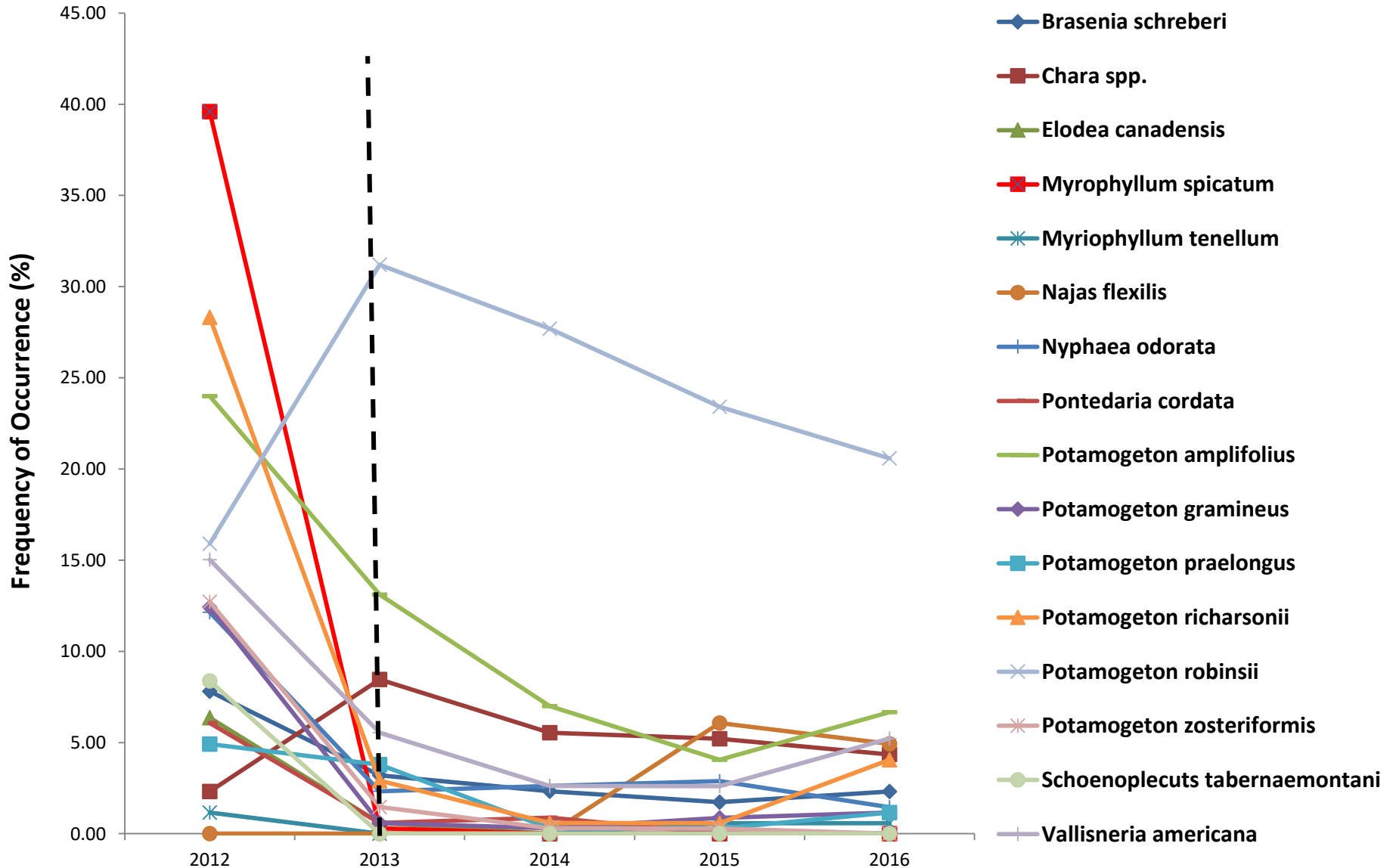
Bass Lake – Frequency of Occurrence of Common Aquatic Plant Species (greater than 5%)



Clearwater Lake – Frequency of Occurrence of Common Aquatic Plant Species (greater than 5%)



Langford Lake – Frequency of Occurrence of Common Aquatic Plant Species (greater than 5%)



Threatened and Endangered Species – *Myriophyllum farwellii*



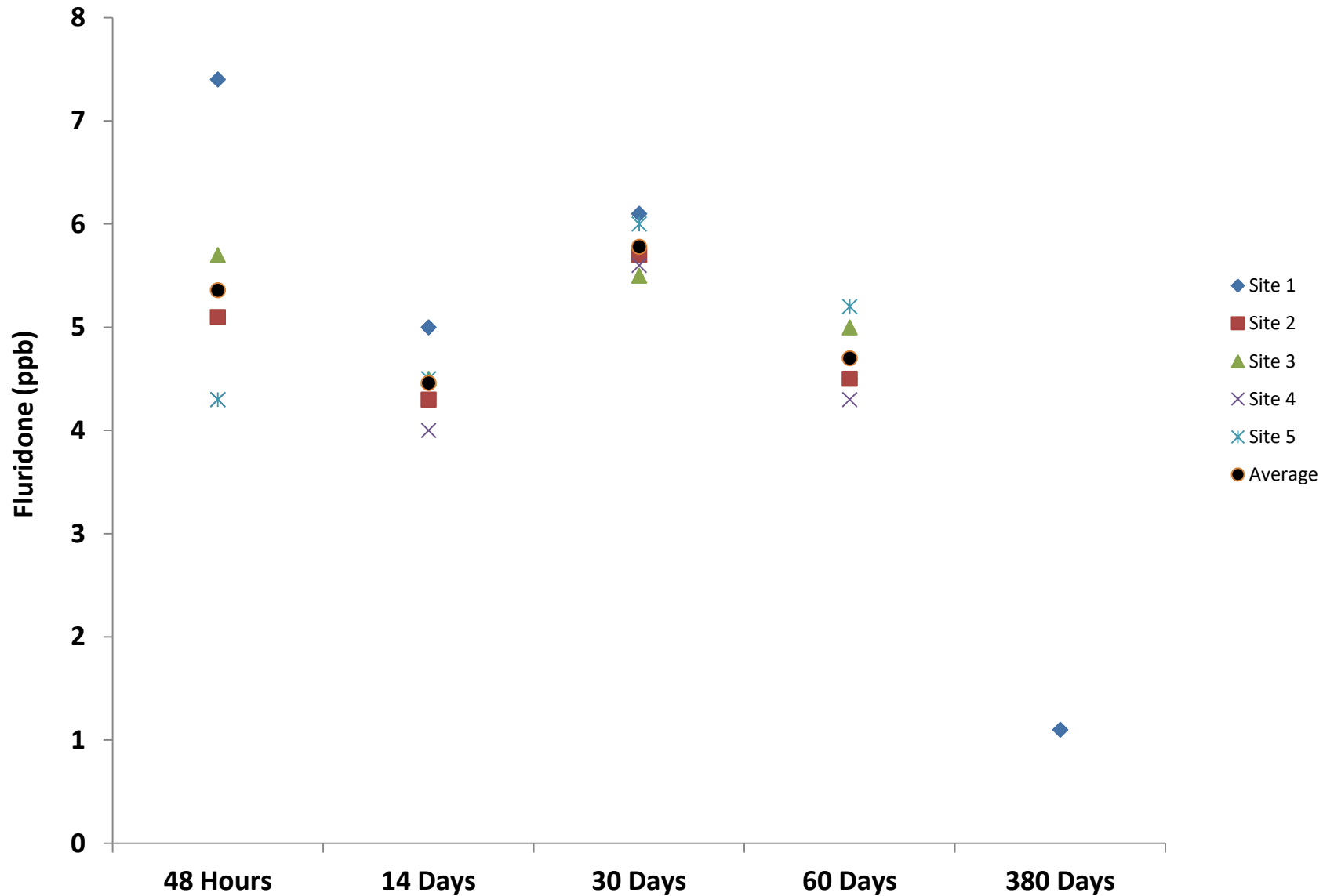
Langford Lake

Bass Lake

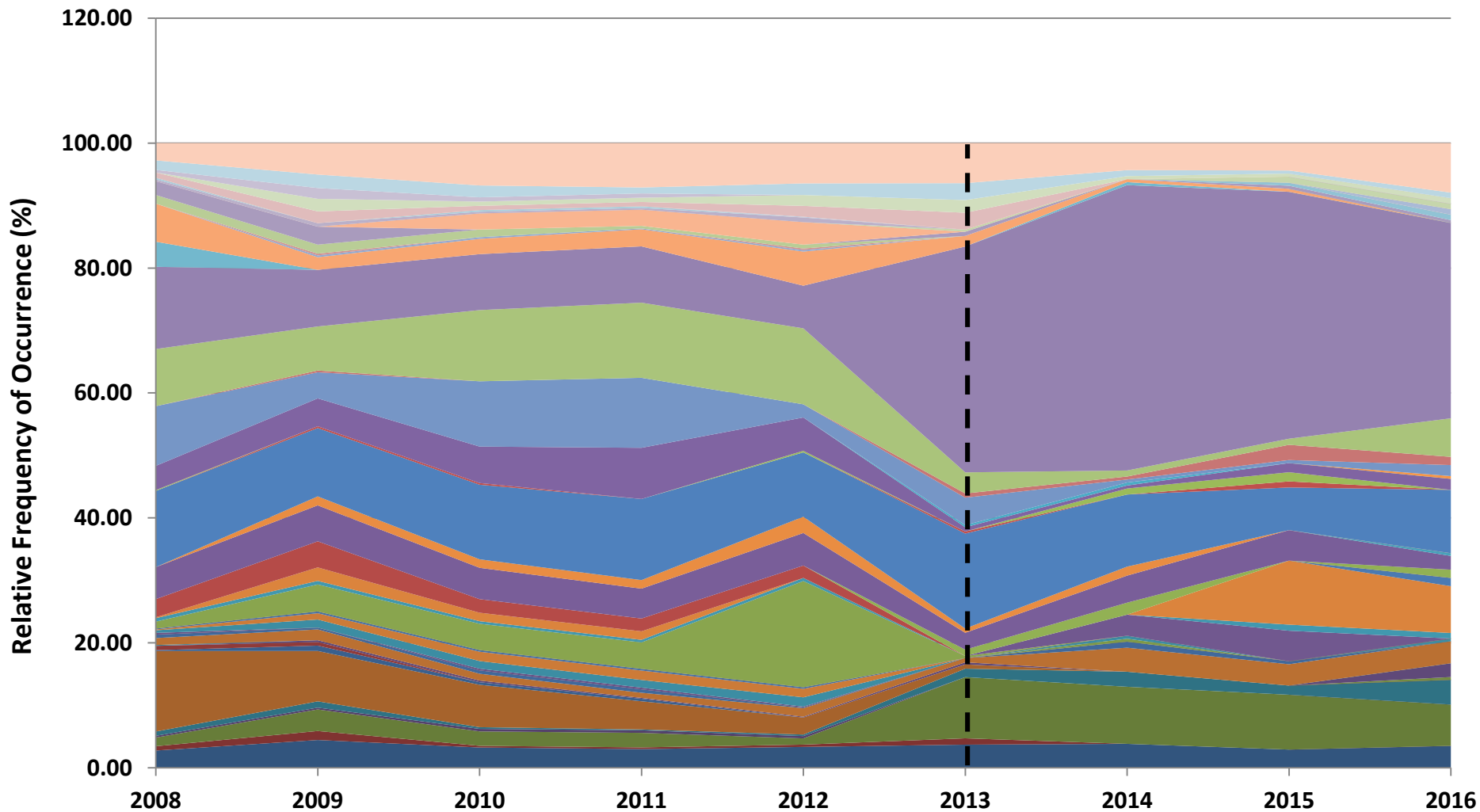


Total number of whole plants observed	5
Total number of plant fragments observed	63
Average number of new shoots observed per sample	1.38
Average length (cm) of new growth observed (off shoot arising from stem)	5.43
Average length (cm) of new growth observed - total (arising from tip)	14.00
Average length (cm) of new growth with observed chlorosis (arising from tip)	5.45
Number of plants with flowers observed	0
Number of plants with fruits observed	0

Langford Lake - Fluridone Concentrations (ppb)



Langford Lake – Relative Frequency (%) of all Species Detected 2008-2016



Acknowledgments

Ian Shackleford – United States Forest Service

John Skogerboe – US Army Corps of Engineers (ERDC)

Invasive Species Control Coalition of Watersmeet

Langford Lake Milfoil Association

Cisco Chain Riparian Owners Association

Bass Lake Association

Thank you!



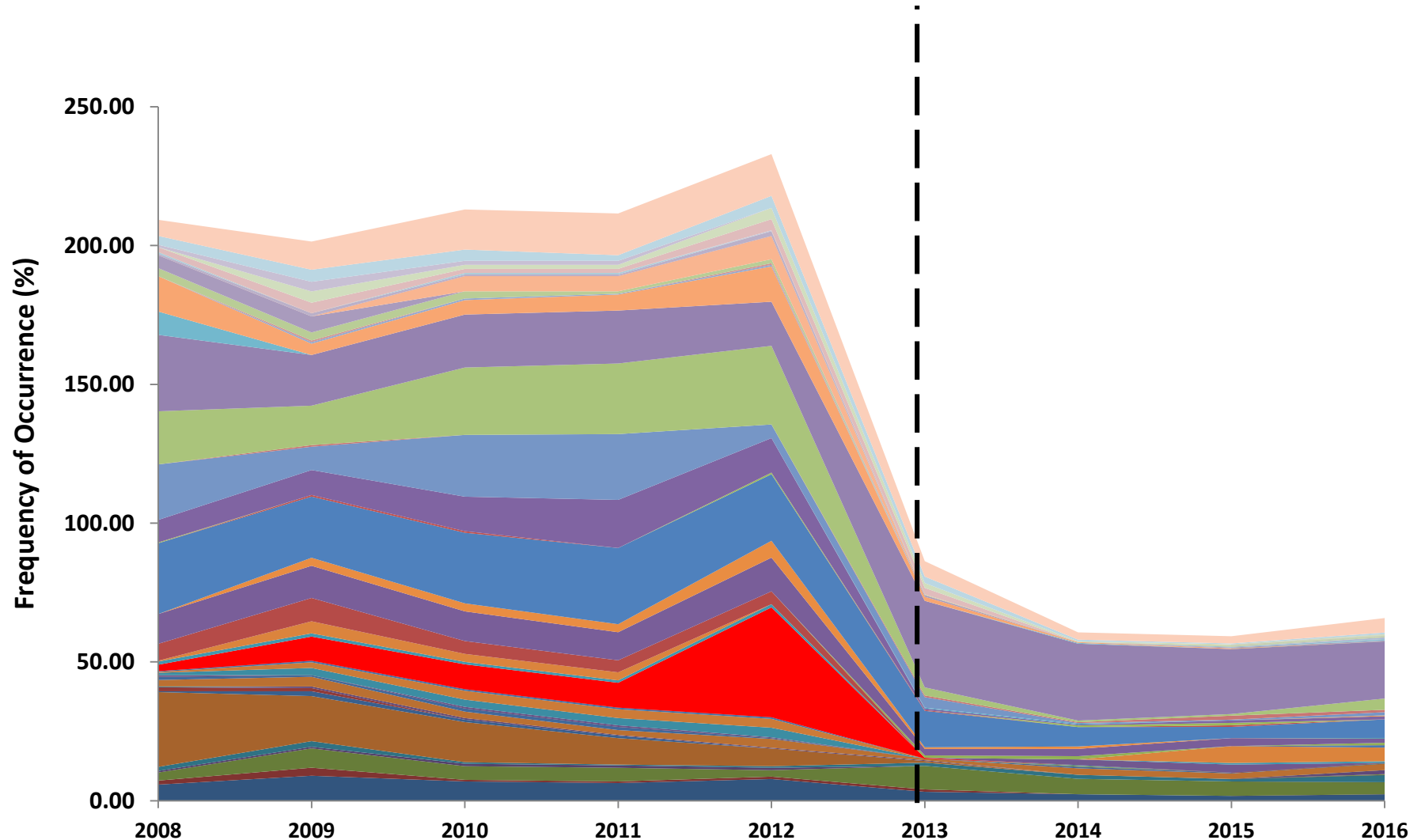
Langford Lake - Preliminary

	2012-2013	2013-2014	2014-2015
<i>Brasenia schreberi</i>	-	-	-
<i>Chara spp.</i>	+	-	-
<i>Elodea canadensis</i>	-	-	no change
<i>Isotes spp.</i>	-	+	-
<i>Lobelia dortmanna</i>	-	+	-
<i>Megalodonta beckii</i>	-	no change	no change
<i>Myrophyllum spicatum</i>	-	-	no change
<i>Nitella spp.</i>	no change	+	+
<i>Myriophyllum tenellum</i>	-	no change	+
<i>Najas flexilis</i>	no change	no change	+
<i>Nuphar advena</i>	-	no change	no change
<i>Nuphar variegata</i>	+	+	-
<i>Nyphaea odorata</i>	-	+	+
<i>Pontedaria cordata</i>	-	+	-
<i>Potamogeton amplifolius</i>	-	-	-
<i>Potamogeton gramineus</i>	-	-	+
<i>Potamogeton praelongus</i>	-	-	-
<i>Potamogeton richarsonii</i>	-	-	-
<i>Potamogeton robinsii</i>	+	-	-
<i>Potamogeton zosteriformis</i>	-	-	no change
<i>Utricularia gibba</i>	-	-	no change
<i>Vallisneria americana</i>	-	-	-

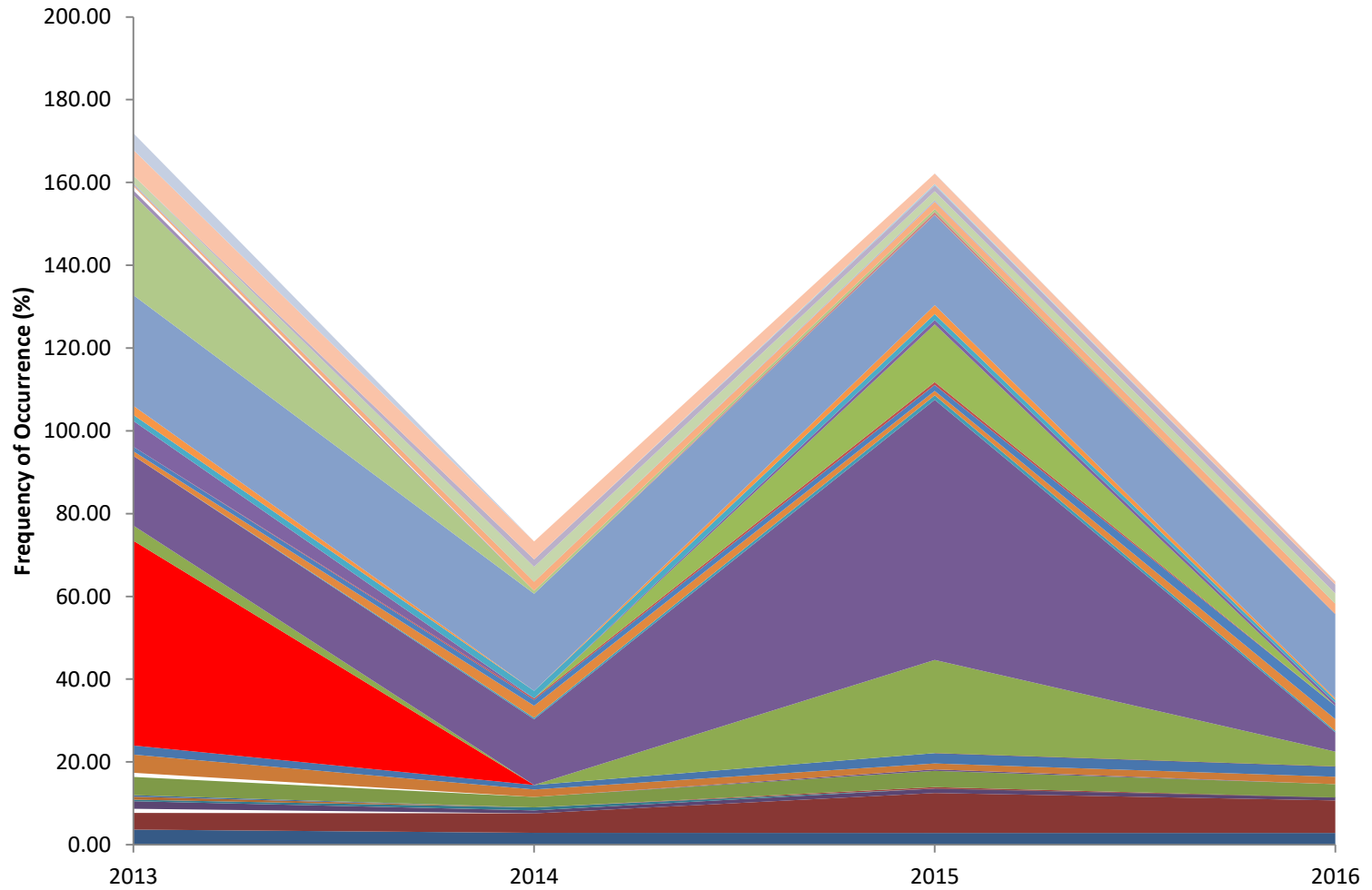
Goals

- Create/Protect Fish & Wildlife Habitat
- Improve Native Plant Diversity
- Remove Exotic Plant Species
- Minimize Risk of Spread to Surrounding Waterbodies

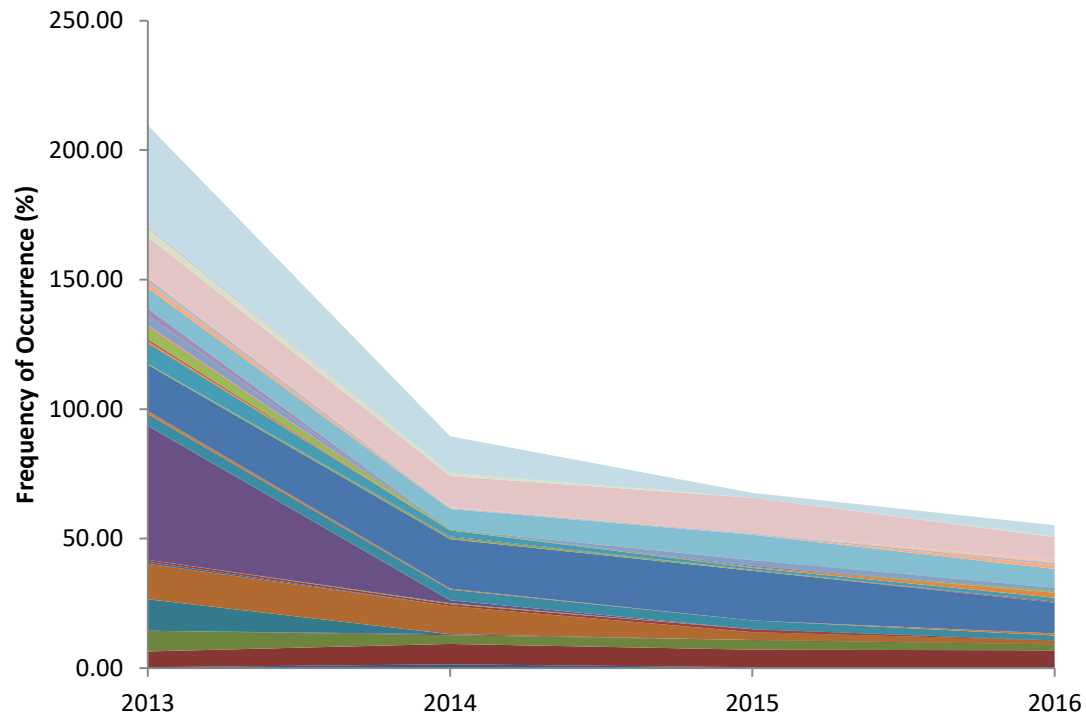
Langford Lake – Frequency of Occurrence (%) of all Aquatic Plant Species from 2008-2016



Bass Lake



Clearwater Lake



Langford Lake – Frequency of Occurrence – All Aquatic Plant Species

